524536-0-1-TM

DATATAPE®

12-469-1
AC POWER SUPPLY

TECHNICAL MANUAL

BELL & HOWELL
DATATAPE DIVISION
300 SIERRA MADRE VILLA, PASADENA, CA 91109

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SECTION I

GENERAL DESCRIPTION

1-1. GENERAL.

1-2. This manual describes the Type 12-469-1 AC Power Supply and its application in the Type CPR-4010 or Type 4020 Magnetic Tape Record/Reproduce Systems. The effectivity of this manual is limited to the power supply, with Bell & Howell part number 524536-0100 that is manufactured by Power Systems, Inc., Bloomfield, Connecticut. The location of the power supply in the tape system is illustrated in figure 1-1. More than one type power supply can be used with the CPR-4010 and 4020 tape systems, therefore, check the placard on the power supply to verify the above-mentioned part number and manufacturer.

1-3. FUNCTION AND USE.

1-4. The power supply assembly provides all the operating dc voltage requirements for the transport motors, control circuits, and signal electronics. The voltages furnished are +18 Vdc, -18 Vdc, +15 Vdc, -15 Vdc, and +5 Vdc. The input voltages may be 115, 200, 220, 240, or 260 V rms at either frequency range of 47-63 Hz or 380-420 Hz.

1-5. EQUIPMENT DESCRIPTION.

1-6. The power supply assembly is located on the base of the 12-401C Tape Transport frame (see figure 1-1). The overall dimensions are 16-1/8 inches by 6 inches by 5-1/4 inches. The major components of the power supply assembly are the power transformer, filter capacitors, heat sink assembly, and a printed circuit board which contains the regulator circuit, over-current sensors, and overvoltage protection.

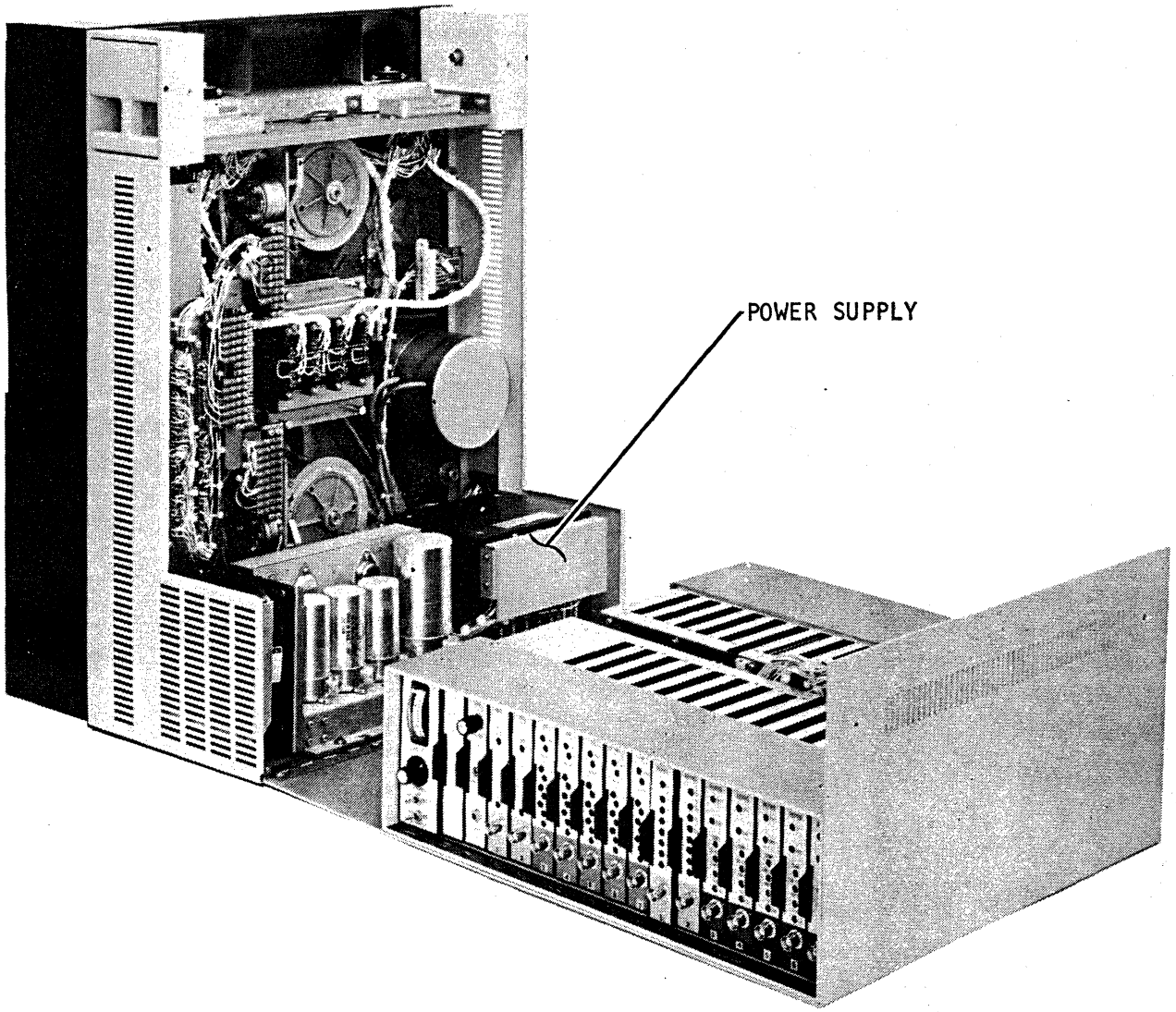


Figure 1-1. Location of Power Supply

SECTION II

INSTALLATION

2-1. GENERAL.

2-2. The 12-469-1 AC Power Supply is installed at the factory as part of a tape system. All cabling is complete and the power supply is ready for operation.

SECTION III

OPERATING INSTRUCTIONS

3-1. GENERAL.

3-2. When installed in the tape system, the 12-469-1 AC Power Supply is operative. The ac power is controlled by the system POWER switch on the transport control panel.

SECTION IV

MAINTENANCE

4-1. GENERAL.

4-2. Maintenance consists of preventive maintenance which should be regularly scheduled as indicated below, and corrective maintenance which includes troubleshooting, repair, and replacement of defective parts. Maintenance should be performed only by qualified electronic technicians and personnel thoroughly familiar with this type of equipment.

4-3. Indiscriminate unsoldering, resoldering, and replacement of parts should be avoided. Only parts of the highest quality have been used in the manufacture of the unit. Replacement parts should be of comparable quality if the inherent reliability built into the unit is to be maintained.

4-4. PARTS IDENTIFICATION.

4-5. A complete replacement parts list and illustrations for the power supply are included in Section V of this manual. The parts list contains the description of the part, part number, schematic symbol or figure reference, and where applicable, the manufacturer's part number of each component. The schematic diagram is included in Section VI.

4-6. PREVENTIVE MAINTENANCE.

4-7. Preventive maintenance consists of general cleaning and periodic inspection. Accumulation of dust, dirt, grit, and/or grease is harmful and should be guarded against by periodic inspection and cleaning. Every three months, inspect the power supply for signs of deterioration, loose connections, insecurity of mounting, and foreign matter. The period of cleaning depends on the particular operating environment and should be determined by inspection. As necessary, clean with a soft brush or low air pressure.

4-8. CORRECTIVE MAINTENANCE.

4-9. Corrective maintenance consists of troubleshooting, and repair or replacement of defective wiring, solder joints, or component parts. When replacing parts, always use new, known-good components of the proper electrical rating, physical dimensions, and other characteristics. See the parts list in Section V of this manual.

4-10. Before attempting the repair of the power supply, verify that the trouble is not caused by a malfunction in the associated power cable or blown input fuses. Once the existence of a defect in the power supply has been established, visually inspect it. This will eliminate the possibility of troubleshooting obviously defective components.

4-11. The very best troubleshooting tool is a familiarity with the equipment. A complete schematic diagram for the power supply is located in Section VI of this manual.

4-12. REPAIR.

4-13. Repair of the power supply should be attempted only by electronics technicians and personnel experienced with this type of equipment. Recommended repair is limited to the replacement of defective components and wiring. When removing and replacing defective components be careful not to burn or damage the surrounding circuit parts. Be sure replacement parts are known to be good and of the correct type and value (refer to the parts list). When installing new parts, place them in the exact position of the replaced part and, after replacement, inspect for evidence of cold solder joints, solder splashes, and insecurity of mounting.

4-14. FIELD REPAIR SERVICE.

4-15. Regular scheduled maintenance service is available from the Bell & Howell DATATAPE Division Sales and Service Office on a contract basis. If immediate service is required, it may be obtained on an emergency basis. Every effort is made to furnish the needed repair as soon as possible. For a complete description of Bell & Howell's maintenance service plans and their costs, contact the DATATAPE Division Sales and Service Office.

4-16. FACTORY REPAIR SERVICE.

4-17. If desired, instruments (or major assemblies) may be returned to the factory for repair. When an instrument or assembly is returned:

a. Indicate the symptom of defect. State as completely as possible, both on an instrument tag and on the order form, the nature of the problem encountered. Too much information is far better than too little. If the trouble is intermittent, please be specific in describing the instrument's performance history.

b. Give special instructions. If any changes in the instrument or assembly have been made, and it is desired to retain the modified form, please indicate this specifically.

c. State the desired invoicing procedure. In the first correspondence, indicate whether repair work may begin immediately with billing in accordance with the standard pricing system or whether Bell & Howell should secure prior approval of the price before proceeding with the repair. The price will be the same in both cases, but any delay will be minimized by permission to start work immediately. The order acknowledgment copy will, of course, always show the price.

d. Pack securely and label. Proper packaging saves money. The small amount of extra care and time it takes to cushion a part or instrument properly may prevent costly damage while in transit. Make certain that the address is both legible and complete; failure to do so often results in needless delay. Address all shipments and correspondence to:

Bell & Howell
DATATAPE Division
300 Sierra Madre Villa
Pasadena, California 91109

Attention: Repair Department

e. Show return address on repair correspondence. Please indicate clearly the exact address to which the equipment should be returned after repair is completed. All shipping costs will be borne by the owner of the equipment, not by Bell & Howell.

SECTION V

PARTS LIST

5-1. GENERAL.

5-2. An appropriate parts list and illustration for ac power supply follow the instructions given below. The Bell & Howell DATATAPE Division part number for the power supply is 524536-0100. The manufacturer of the power supply is Power Systems, Inc., Bloomfield, Connecticut. The parts list includes the part description, schematic designator, supplier part number, and supplier FSCM number. Components are illustrated in figure 5-1.

5-3. ORDERING REPLACEMENT PARTS.

5-4. Parts should be ordered through the nearest Bell & Howell DATATAPE Division Sales and Service Office. Price and delivery information on parts or complete instruments may be obtained there also. To assist in making this contact, a list of Sales and Service Offices is included in the front of this manual. Bell & Howell recommends that whenever possible, and particularly when an instrument is used in a critical application, the user maintain a minimum stock of spare parts. DATATAPE Division has specialized personnel ready to assist the user in making a selection of spares at any time. The same personnel are also ready and able to prepare or quote on the preparation of illustrated parts breakdowns (IPB's), provisioning parts breakdowns (PPB's), and other parts documentation that might be required.

5-5. When ordering parts, the following information should always be supplied to the field office engineers:

a. A description of the part or assembly, obtained from the parts list.

b. The Bell & Howell part or assembly number, also on the parts list, or on the component itself.

c. The figure and index, and/or reference symbol, given on the applicable diagram and on the parts list.

d. The part or type number of the major assembly, shown on the instrument nameplate.

e. The production serial number, also on the nameplate.

f. The Bell & Howell register number applying to the complete system or order.

PARTS LIST

ITEM NO.	DESCRIPTION	SCHEMATIC DESIGNATOR	SUPPLIER PART NO.	SUPPLIER (FSCM)
1	BRACKET, R.H. FAN		520846	50463
2	BRACKET, L.H. FAN		520835	50463
3	BRACKET, A.C. TERMINALS		520837A	50463
4	BRACKET, CUSTOMER TERMINAL		520839	50463
5	BRACKET ASSEMBLY		510443	50463
6	BUSHING, INSULATOR		TW-260-300-050T	08289
7	CAPACITOR, CERAMIC, .0047uF/200V	C6,13,19	CK06BX472K	MIL QPL
8	CAPACITOR, CERAMIC, .01uF/100V	C5,12,18	TGS10	56289
9	CAPACITOR, CERAMIC, .1uF/50V	C7A	CK05BX104K	MIL QPL
10	CAPACITOR, ELECTRIC 50uF/25V	C20	TE1209	56289
11	CAPACITOR, ELECTRIC 200uF/25V	C24,27	500D207G025DH7	56289
12	CAPACITOR, ELECTRIC 250uF/16V	C1,8,21,28	500D257G016DF7	56289
13	CAPACITOR, ELECTRIC 300uF/50V	C15,15A	500D307G050FH7	56289
14	CAPACITOR, ELECTRIC 1000uF/16V	C7	500D108G016FJ7	56289
15	CAPACITOR, ELECTRIC 4000uF/25V	C14	39D408G025JS6	56289
16	CAPACITOR, ELECTRIC 8000uF/30V	C22,25	86F547L	01002
17	CAPACITOR, ELECTRIC 1500uF/30V	C2	86F520L	01002
18	CAPACITOR, ELECTRIC 1900uF/40V	C9	86F559L	01002
19	CAPACITOR, MYLAR, .01uF/80V	C3,10,16,23, 26	192P1039R8	56289
20	CAPACITOR, MYLAR, .22uF/200V	C29A	192P22492	56289
21	CAPACITOR, TANTALUM, 2.2uF/20V	C4,11,17	CS13BE225K	MIL QPL
22	CHASSIS		520843A	50463
23	COVER, TRANSFORMER		520843B	50463
24	COVER, FUSE		520840	50463
25	COVER, HEATSINK		520838	50463
26	COVER, BRACKET		520842	50463
27	CRADLE, WIRING		TM2S6-C	06383
28	CRADLE, WIRING		ABMS-A-D	06383
29	DIODE, RECTIFIER	CR1,2,3,4, 5,6,7,8,9, 10,11,12,13, 14,15,16,21, 22,23,24,25, 26,27,28	1N4003	JEDEC TYPE
30	DIODE, RECTIFIER	CR17,18,19, 20	60S05	81483
31	DIODE, ZENER	ZR5,7	1N823	JEDEC TYPE
		ZR1	1N4734A	JEDEC TYPE
		ZR4,6	1N4745A	JEDEC TYPE
		ZR2,3	1N4747A	JEDEC TYPE
32	FAN, ELECTRIC		4600	23936
33	FUSE, 0.5A, 3AG	F5	312.500	75915

Table 5-1. Parts List (Sheet 1 of 5)

PARTS LIST

ITEM NO.	DESCRIPTION	SCHEMATIC DESIGNATOR	SUPPLIER PART NO.	SUPPLIER (FSCM)
34	FUSE, 3A, 3AG	F3,6,7	312003	75915
35	FUSE, 10A, 3AB, 250V S.B.	F1,2	MDA	71400
36	FUSE, 15A, 3AG	F4	311015	75915
37	FUSE BLOCK		3823-7	71400
38	GROMMET, RUBBER		91107	83330
39	HEATSINK		520836	50463
40	HEATSINK ASSY		510444	50463
41	INSULATOR		43-02-26	13103
42	INSULATOR		43-03-1	13103
43	INSULATOR		43-66-2	13103
44	INTEGRATED CIRCUIT, OP AMP	A1,2,3	CA-3085A	02735
45	INTEGRATED CIRCUIT, OP AMP	A4,5	LM307H	27014
46	NUT, HEX, 1/4 - 20		--	COMMON
47	NUT, SELF-LOCKING (KEP), 4-40		--	HARDWARE
48	NUT, SELF-LOCKING (KEP), 6-32		--	ITEM
49	PC BOARD ASSY #1		510441	50463
50	PC BOARD ASSY #2		510442	50463
51	PLATE, BUTTOM		520921	50463
52	RECTIFIER, BRIDGE, FULL-WAVE	RB1	SCNA05	14099
53	RECTIFIER, BRIDGE, FULL-WAVE	RB2	MDA-990-2	04713
54	RESISTOR, FXD., COMP., 330Ω, 1/2W,5%	R8,16	RC20GF331J	MIL QPL
55	RESISTOR, FXD., COMP., 470Ω, 1/2W,5%	R2,7,20,23, 48,53,60,65	RC20GF471J	MIL QPL
56	RESISTOR, FXD., COMP., 520Ω, 1/2W,5%	R39	RC20GF521J	MIL QPL
57	RESISTOR, FXD., COMP., 820Ω, 1/2W,5%	R5	RC20GF821J	MIL QPL
58	RESISTOR, FXD., COMP., 1.0KΩ, 1/2W,5%	R25,38	RC20GF102J	MIL QPL
59	RESISTOR, FXD., COMP., 1.2KΩ, 1/2W,5%	R73	RC20GF122J	MIL QPL
60	RESISTOR, FXD., COMP., 2.7KΩ, 1/2W,5%	R76,77	RC20GF272J	MIL QPL
61	RESISTOR, FXD., COMP., 3.3KΩ, 1/2W,5%	R23,51,59	RC20GF332J	MIL QPL
62	RESISTOR, FXD., COMP., 4.7KΩ, 1/2W,5%	R36	RC20GF472J	MIL QPL
63	RESISTOR, FXD., COMP., 10KΩ, 1/2W,5%	R15,46,63	RC20GF103J	MIL QPL
64	RESISTOR, FXD., COMP., 33KΩ, 1/2W,5%	R66,75	RC20GF333J	MIL QPL
65	RESISTOR, FXD., COMP., 100KΩ, 1/2W,5%	R4,22,35, 49,58,71,72	RC20GF104J	MIL QPL

PARTS LIST

ITEM NO.	DESCRIPTION	SCHEMATIC DESIGNATOR	SUPPLIER PART NO.	SUPPLIER (FSCM)
66	RESISTOR, FXD.,METAL-FILM, 51.1Ω,1%	R10,27,41	RN60D51R1F	MIL QPL
67	RESISTOR, FXD.,METAL-FILM, 162Ω,1%	R14,29,43	RN60D162OF	MIL QPL
68	RESISTOR, FXD.,METAL-FILM, 237Ω,1%	R13	RN60D237OF	MIL QPL
69	RESISTOR, FXD.,METAL-FILM, 619Ω,1%	R56,57,68, 69	RN60D619OF	MIL QPL
70	RESISTOR, FXD.,METAL-FILM, 1.21KΩ,1%	R54,67	RN60D1211J	MIL QPL
71	RESISTOR, FXD.,METAL-FILM, 1.37KΩ,1%	R28,42	RN60D1371J	MIL QPL
72	RESISTOR, FXD.,METAL-FILM, 280KΩ,1%	R9,26,40	RN60D2803J	MIL QPL
73	RESISTOR, FXD.,METAL-FILM,VALUE SELECTED IN TEST,1%	R12,31,45, 50,55,62, 70,6,24,37, 54,64		
74	RESISTOR, FXD.,WIRE-WOUND, 560Ω, 1W	R74	TYPE BWH	75042
75	RESISTOR, FXD.,WIRE-WOUND, .15Ω, 3W	R1,17,18,19	TYPE EL-3	94322
76	RESISTOR, FXD.,WIRE-WOUND, .2Ω, 3W	R47,61	TYPE EL-3	94322
77	RESISTOR, FXD.,WIRE-WOUND, 1.5Ω, 3W	R32	TYPE EL-3	94322
78	RESISTOR, VARIABLE, 500Ω, 1/2W	R3,11,21, 30,34,44, 48A,60A	72XWR500	73138
79	RIVET, BLIND		AD-34-BS	07707
80	RIVET, BLIND		AD-43-BS	07707
81	RIVET, BLIND		AD-45-BS	07707
82	SCREW, MACHINE, PAN HEAD, 4-40 x 1/2			COMMON HRDWR ITEM
83	SCREWS, MACHINE, PAN HEAD, 6-32 x 1/4			
84	SCREWS, MACHINE, PAN HEAD, 6-32 x 3/8			
85	SCREWS, MACHINE, PAN HEAD, 6-32 x 1/2			
86	SCREWS, MACHINE, PAN HEAD, 6-32 x 3/4			
87	SCREWS, MACHINE, PAN HEAD, 8-32 x 3/8			COMMON HRDWR ITEM

Table 5-1. Parts List (Sheet 3 of 5)

PARTS LIST

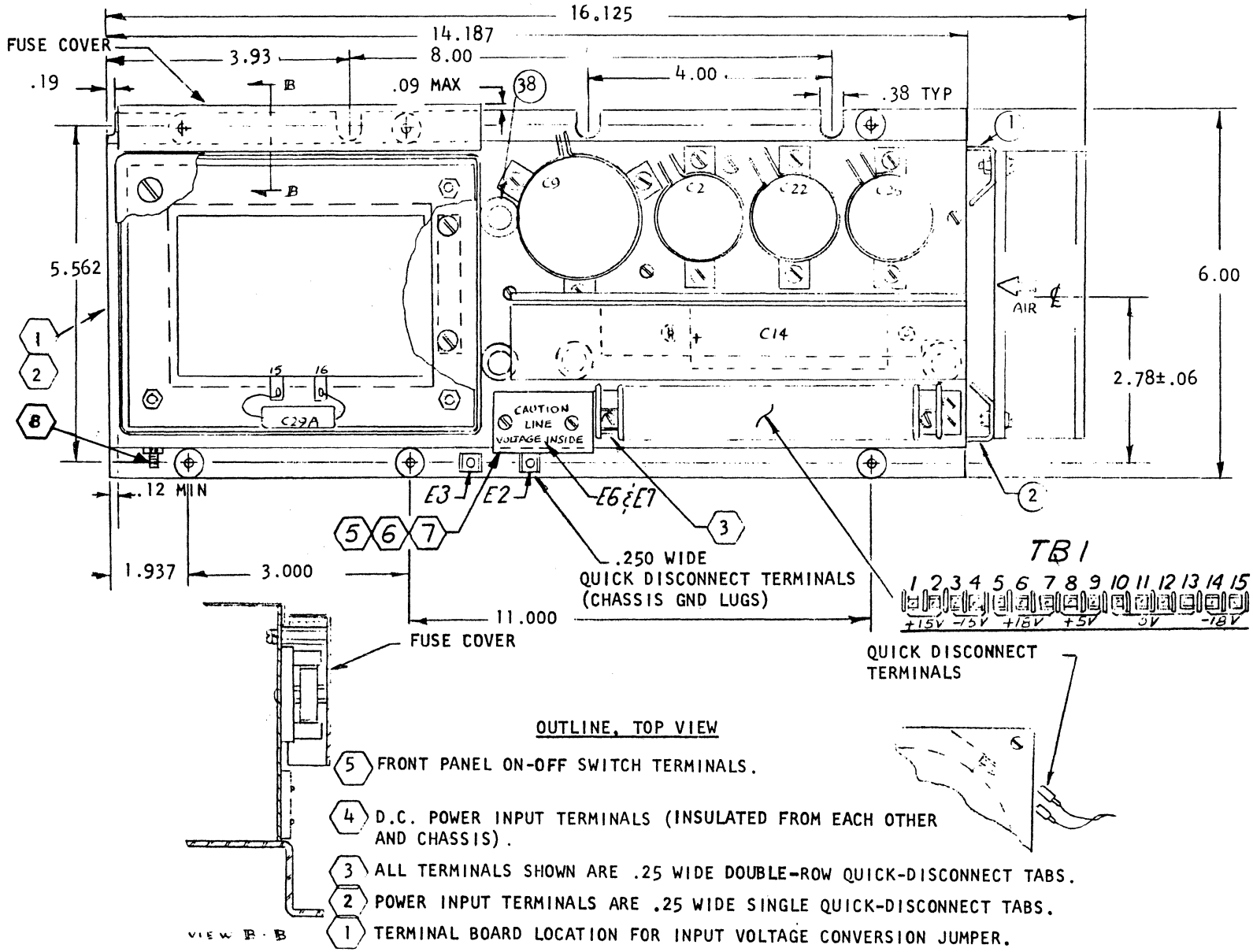
ITEM NO.	DESCRIPTION	SCHEMATIC DESIGNATOR	SUPPLIER PART NO.	SUPPLIER (FSCM)
88	SCREWS, MACHINE, PAN HEAD, 8-32 x 3			COMMON HRDWR ITEM
89	SCREW, MACHINE, FLAT HEAD, 4-40 x 3/8			
90	SCREW, MACHINE, FLAT HEAD, 7-32 x 1/4 (UNDERCUT HEAD)			
91	SCREW, MACHINE, FLAT HEAD, 6-32 x 3/8			
92	SCREW, MACHINE, FLAT HEAD, 6-32 x 1/2			
93	SCREW, MACHINE, ROUND HEAD, 6-20 x 1/2			
94				
95	SCREW, MACHINE, PAN HEAD, 6-32 x 5/8			
96	SCREW, MACHINE, PAN HEAD, 1/4-20 x 3/4			COMMON HRDWR ITEM
97	SHIELD, TRANSFORMER		520865	50463
98	SOCKET, TRANSISTOR		PTS-5D	22753
99	SOCKET, TRANSISTOR		PTS-2B	22753
100	SPACER, THREADED, 6-32 x 1/2		2322	83330
101	SPACER, THREADED, 6-32 x 3/4		2323	83330
102	SPACER, THREADED, 6-32 x 1		232X	83330
103	SPACER, THREADED, 8-32 x 1-3/8		8584-B-0832	06540
104	SPREADER/INSULATOR, TRANSISTOR		7717-107	13103
105	SPREADER/INSULATOR, TRANSISTOR		7717-44 DAP	13103
106	STANDOFF, INSULATED, 5/8		9740-B-0632	06540
107	TERMINAL, LUG, SOLDER		SBMT-12-6J	91663
108	TERMINAL, LUG, SOLDER		BMT-17-6J	91663
109	TERMINAL, LUG, QUICK-DISCONNECT		1257	91833
110	TERMINAL, STUD, QUICK-DISCONNECT		KT-48	75382
111	TERMINAL BLOCK, BARRIER		600-YSY-15	75382
112	TERMINAL BLOCK, BARRIER		599-3/4ST-6	75382
113	TERMINAL BLOCK, BARRIER		599-3/4ST-2	75382
114	THERMOSTAT	S01	2450-21-290	
115	TIE, CABLE		TYB-23M	59730
116	TRANSFORMER, POWER	T1	541089C	59730
117	TRANSISTOR, 2N2222A	Q3,8,10,13	--	JEDEC TYPE
118	TRANSISTOR, 2N2905A	Q14	--	JEDEC TYPE
119	TRANSISTOR, 2N2907A	Q16	--	JEDEC TYPE
120	TRANSISTOR, 2N3053	Q12	--	JEDEC TYPE
121	TRANSISTOR, 2N3054	Q2,9	--	JEDEC TYPE
122	TRANSISTOR, 2N3055	Q7,11	--	JEDEC TYPE

Table 5-1. Parts List (Sheet 4 of 5)

PARTS LIST

ITEM NO.	DESCRIPTION	SCHEMATIC DESIGNATOR	SUPPLIER PART NO.	SUPPLIER (FSCM)
123	TRANSISTOR, 2N3771	Q1	--	JEDEC TYPE
124	TRANSISTOR, 2N3772	Q4,5,6	--	JEDEC TYPE
125	TRANSISTOR, 2N3789	Q15	--	JEDEC TYPE
126	TRANSISTOR, SCR	SCR1-5	C122F1	09214
127	WASHER, FLAT - 1/4		--	COMMON
128	WASHER, LOCK, #6		--	HARDWARE
129	WASHER, LOCK, #8		--	ITEM
130	WASHER, LOCK, 1/4		--	
131	WASHER, INSULATING, FLAT		2258-F171	06740
132	WASHER, INSULATING, SHOULDER		2665	83330
133	WASHER, HEATSINK		520847	50463
134	SCREW, MACHINE, PAN HEAD, BLACK NYLON, 8-32 x 1/2		--	95987

Table 5-1. Parts List (Sheet 5 of 5)



OUTLINE, TOP VIEW

(5) FRONT PANEL ON-OFF SWITCH TERMINALS.

(4) D.C. POWER INPUT TERMINALS (INSULATED FROM EACH OTHER AND CHASSIS).

(3) ALL TERMINALS SHOWN ARE .25 WIDE DOUBLE-ROW QUICK-DISCONNECT TABS.

(2) POWER INPUT TERMINALS ARE .25 WIDE SINGLE QUICK-DISCONNECT TABS.

(1) TERMINAL BOARD LOCATION FOR INPUT VOLTAGE CONVERSION JUMPER.

NOTES:

FIGURE 5-1. OUTLINE, TOP VIEW (SHEET 1 OF 6)

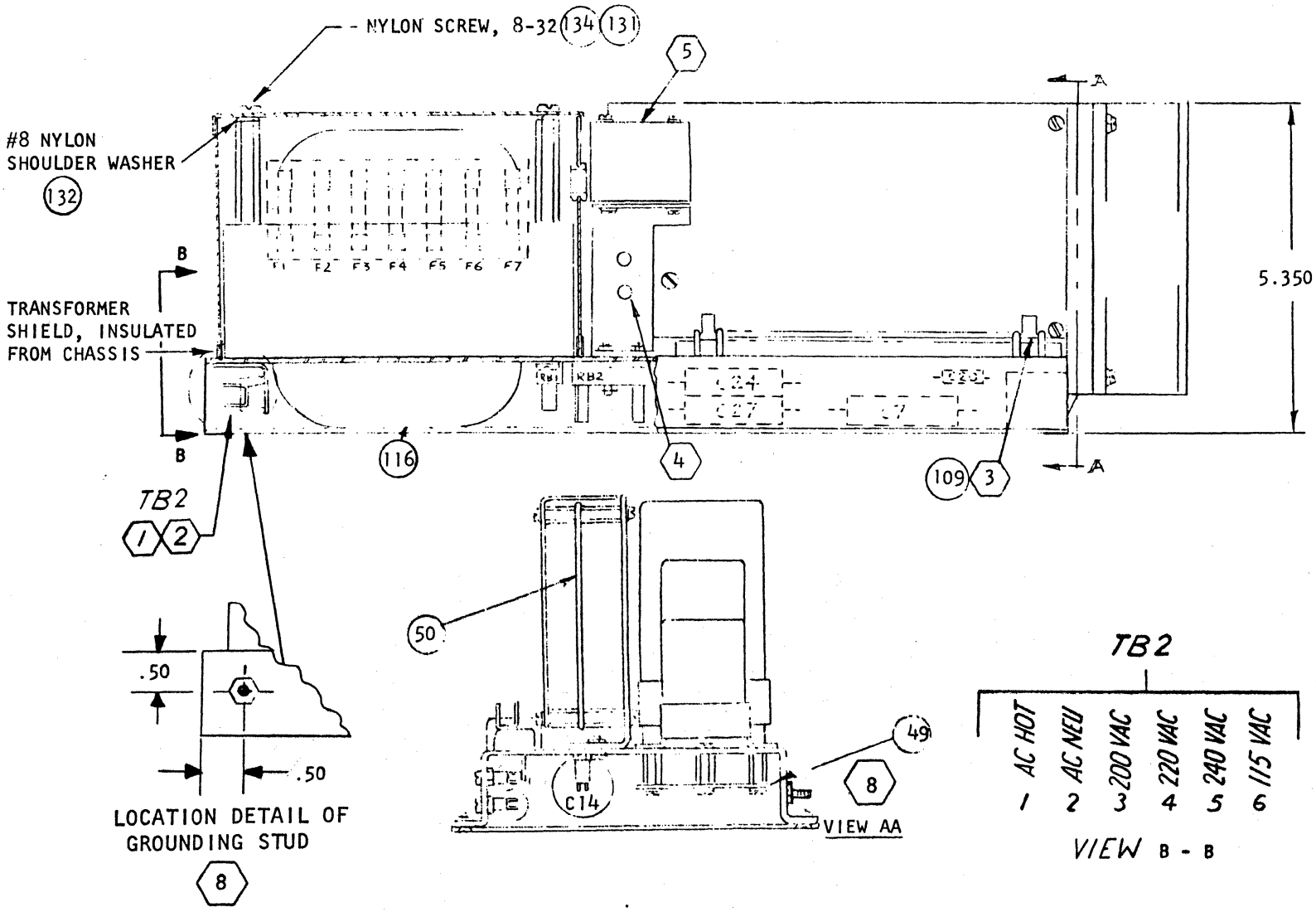


FIGURE 5-1. OUTLINE, SIDE VIEW (SHEET 2 OF 6)

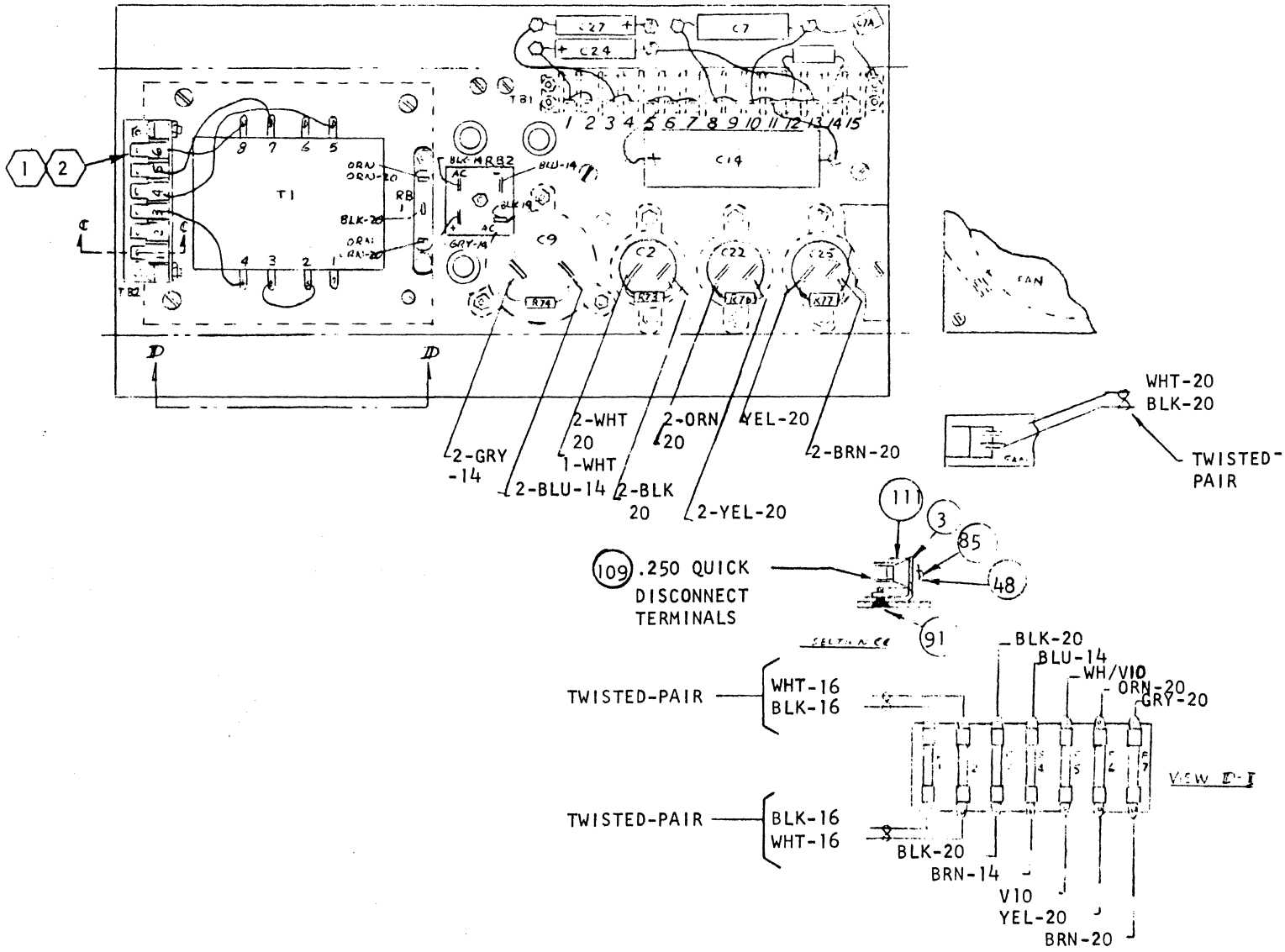


FIGURE 5-1. BOTTOM VIEW, WIRING (SHEET 3 OF 6)

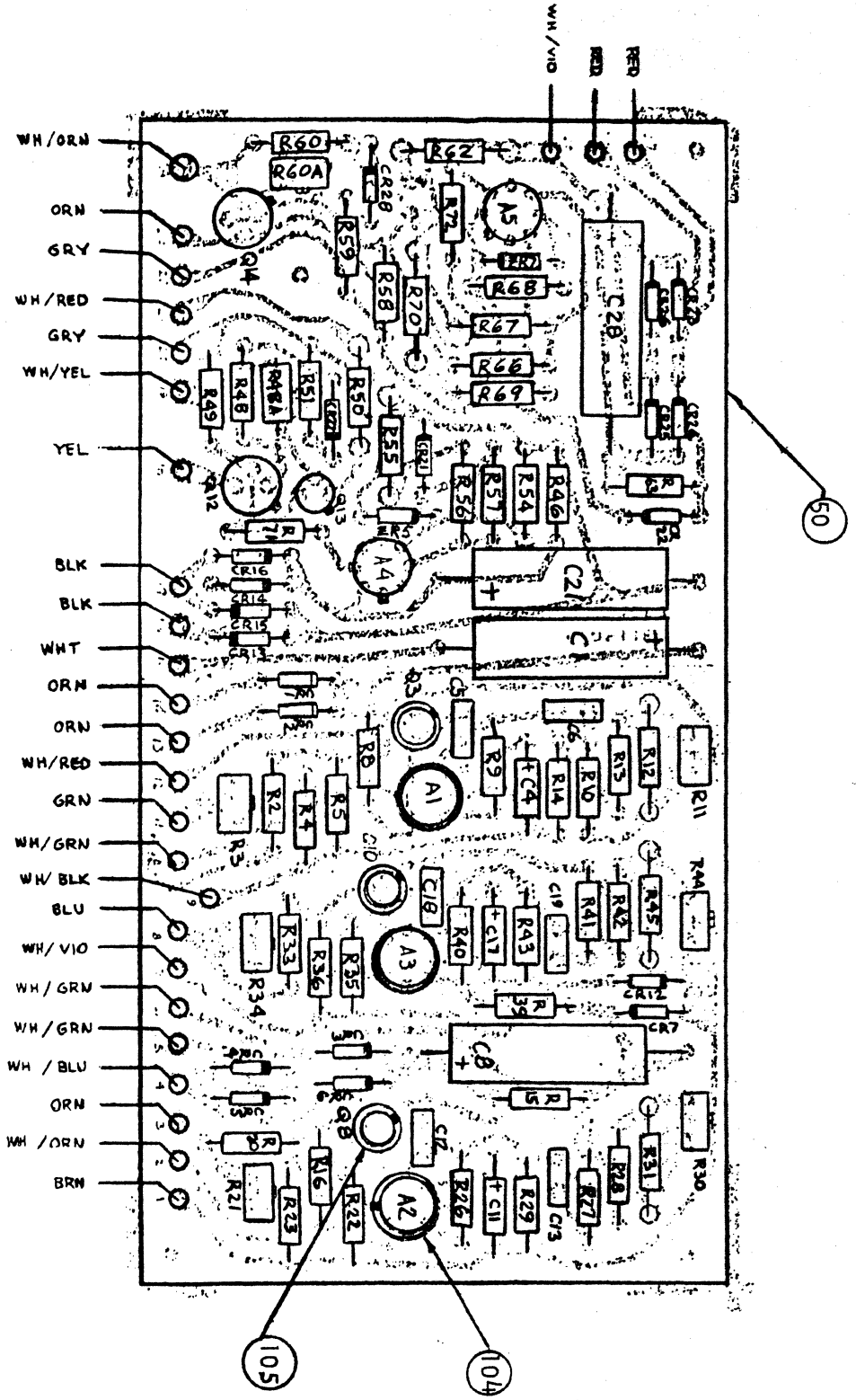


FIGURE 5-1. P.C. BOARD ASSEMBLY #2 (SHEET 4 OF 6)

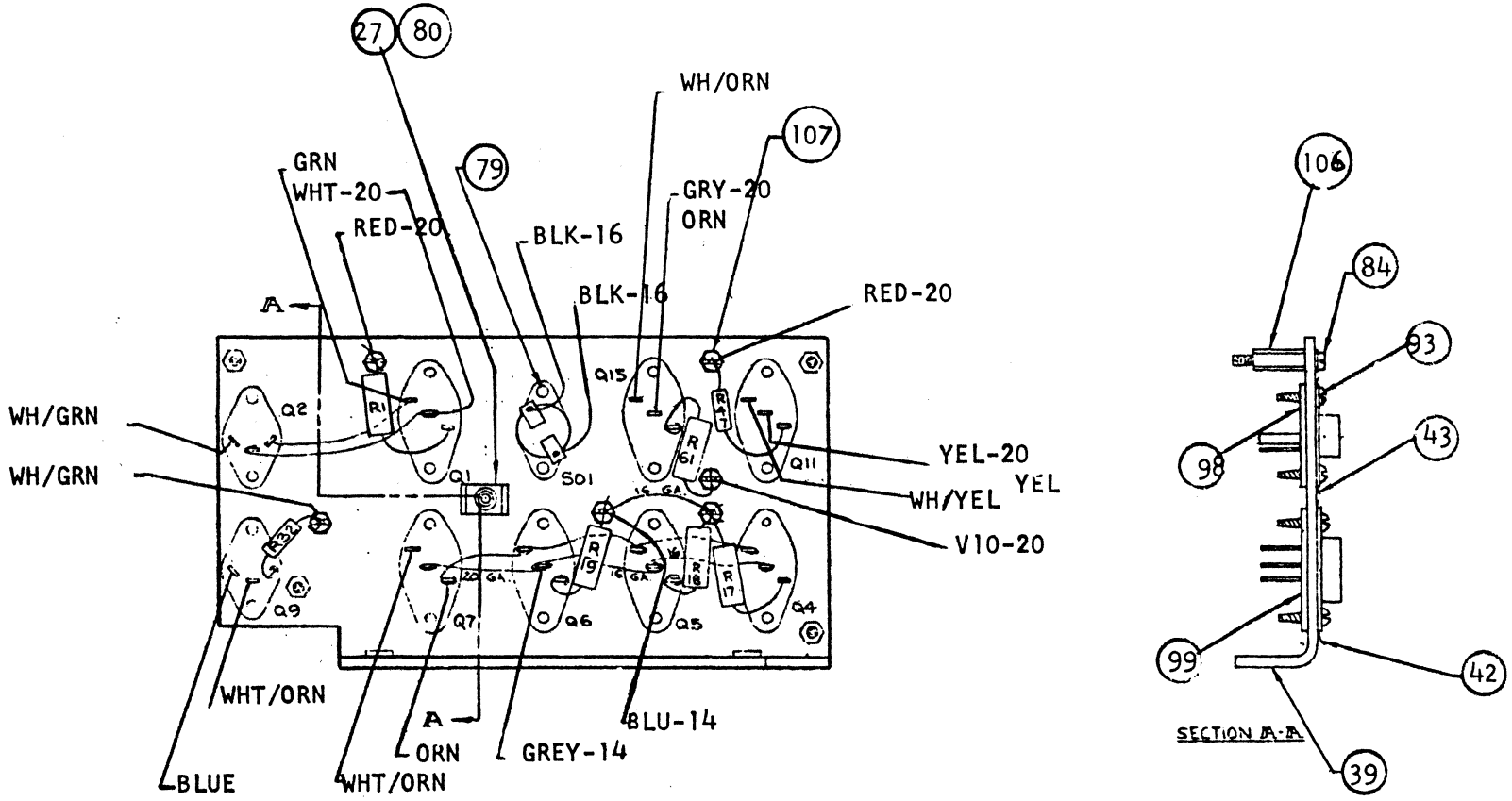


FIGURE 5-1. HEAT SINK ASSEMBLY (SHEET 5 OF 6)

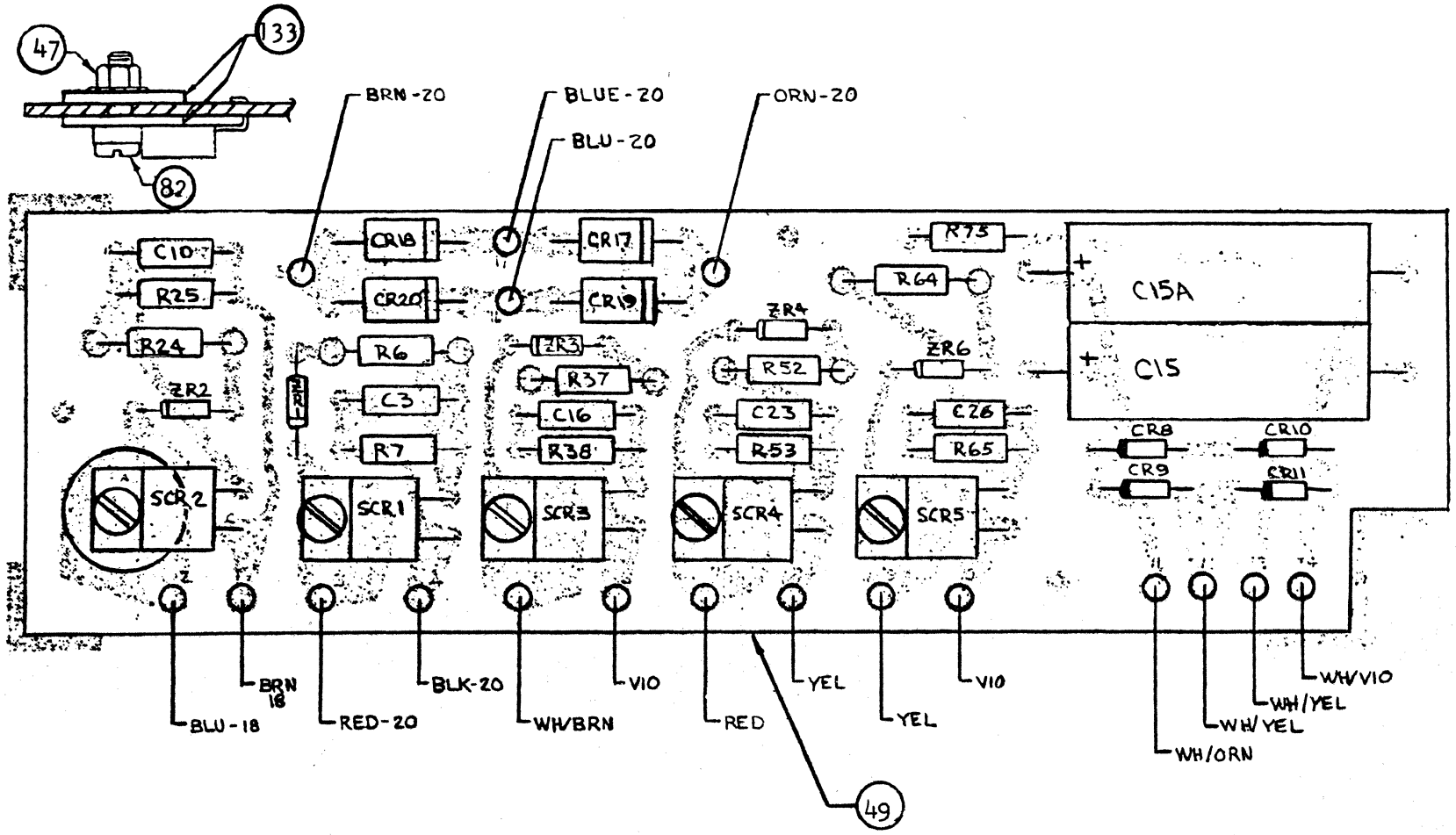


FIGURE 5-1. P.C. BOARD ASSEMBLY #1 (SHEET 6 OF 6)

SECTION VI

DRAWINGS AND SCHEMATICS

6-1. GENERAL.

6-2. This section contains the schematic, figure 6-1, which is referenced in other sections of the manual.

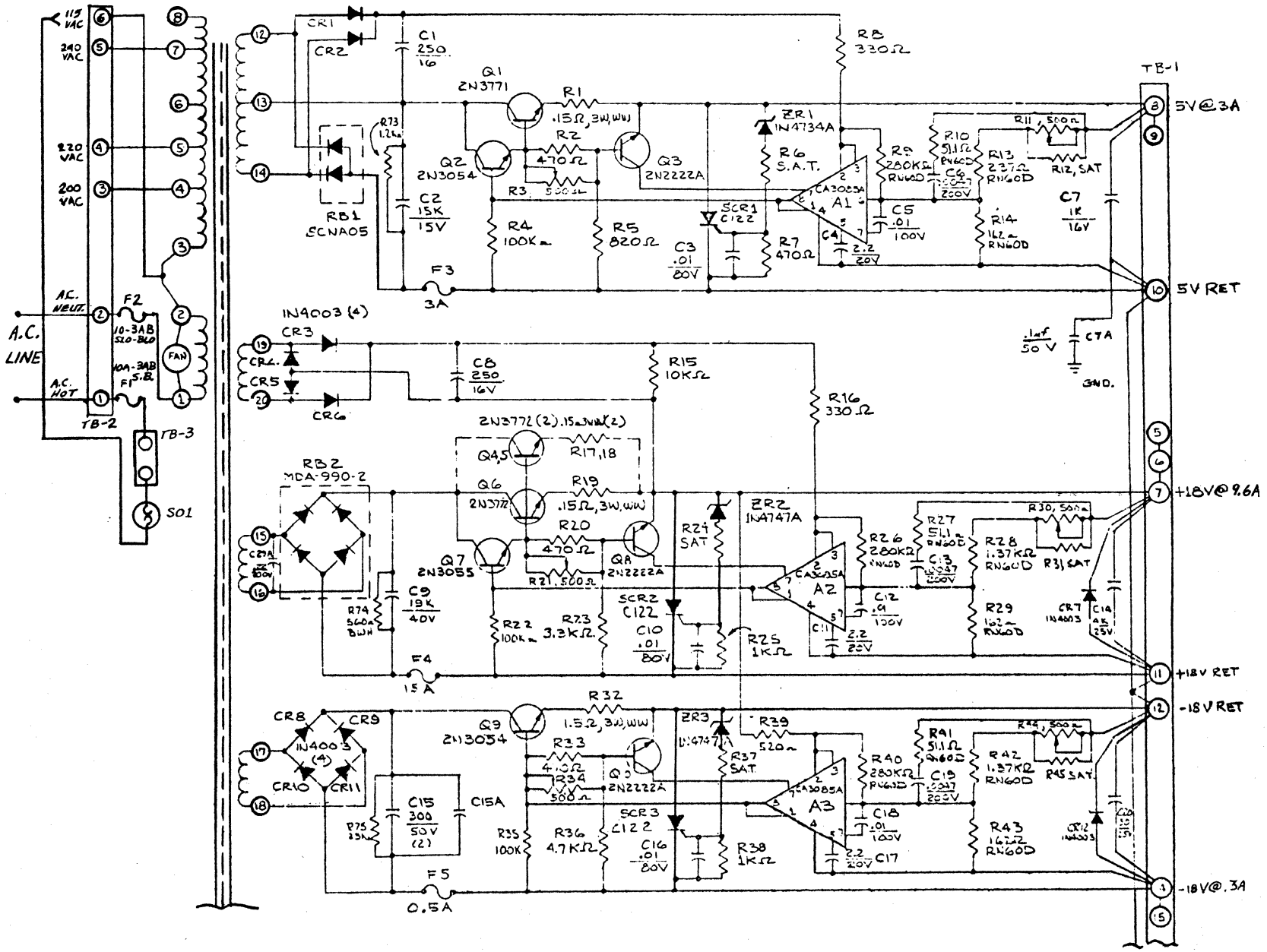


FIGURE 6-1. SCHEMATIC, POWER SUPPLY (SHEET 1 OF 2)

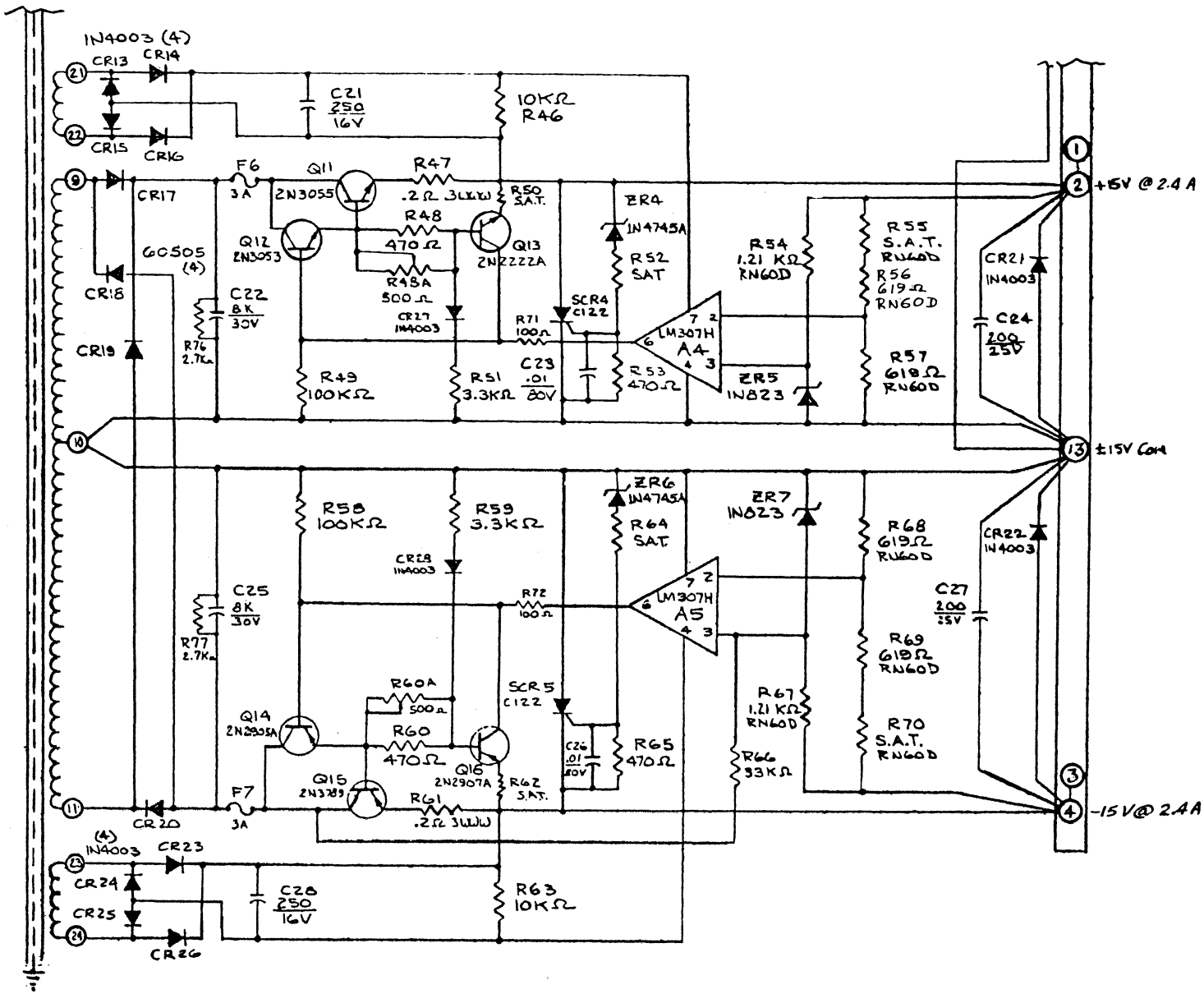


FIGURE 6-1. SCHEMATIC, POWER SUPPLY (SHEET 2 OF 2)